Table S1. Field operations carried out in different cultivation practices at farmer's field

Operations	Fallow land (FL)	Cultivation practices			
		Rice fallow (RF)	Conventional practice (CP)	Conservation agriculture	
				CA1	CA2
Practices followed	Fallow	Farmer's practice (Conventional tillage)	Farmer's practice (Conventional tillage)	Full CA with crop intensification (Zero tillage)	Full CA with crop intensification (Zero tillage)
Crop rotation	Fallow	Fallow	Rice-mustard-black gram	Rice-mustard-black gram	Rice-mustard-black gram
Tillage	No tillage	Rice-CT followed by puddling	Rice-CT followed by puddling; Mustard-CT; Black gram-CT	Rice-ZT unpuddled; Mustard-ZT; Black gram-ZT	Rice-ZT; Mustard-ZT; Black gram-ZT
Crop establishment method	No crop	Rice-puddled transplanted rice (PTR) (Fallow after rice crop)	Rice-puddled transplanted rice (PTR); Mustard-broadcasting; Black gram-broadcasting	Rice-zero tillage transplanted rice (ZTTR); Mustard- line sowing; Black gram-line sowing	Rice-zero tillage direct seeded rice (ZTDSR); Mustard- line sowing; Black gram-line sowing
Crop residue management	No residue	Rice-Removed from ground level	Rice/Mustard/Black gram-Removed	Rice/Mustard: one-third retained; Black gram-Full retained	Rice/Mustard: one-third retained; Black gram-Full retained

CA: conservation agriculture; ZT: zero tillage; CT: conventional tillage; PTR: puddled transplanted rice; ZTTR: zero tillage transplanted rice; ZTDSR: zero tillage direct seeded rice

Table S2. Input requirements for different cultivation practices

Parameters	Cultivation practices									
	RF	CP			CA1			CA2		
	Rice	Rice	Mustard	Black gram	Rice	Mustard	Black gram	Rice	Mustard	Black gram
Fertilizer, kg ha^{-1}										
N	80	80	40	20	80	40	20	80	40	20
P_2O_5	40	40	20	40	40	20	40	40	20	40
K_2O	40	40	20	20	40	20	20	40	20	20
Farm yard manure, kg ha^{-1}	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
Seed, kg ha^{-1}	19	19	5	20	19	5	20	25	5	20
Plant protection chemical, kg ha^{-1}										
Fungicide	0.5	0.5	0.5	0	0.5	0.5	0	0.5	0.5	0
Herbicide	2	2	2	2	2	2	2	2	2	2
Insecticide	1	1	0.5	0.5	1	0.5	0.5	1	0.5	0.5
Irrigation, mm ha^{-1}	0	0	100	150	0	100	150	0	100	150
Diesel, L ha^{-1}	61	58	12	10	39	4	3.5	21	4	3.5
Machinery, hr ha^{-1}	18	18	7	6	12	3	3	10	3	2.5
Labour, 8-hr day ha^{-1}										
Men	46	46	17	14	43	12	10	28	10	8
Women	102	102	32	27	83	21	20	64	20	20

Table S3. Energy equivalents of different inputs and outputs of agricultural production

Particulars	Unit	Energy equivalent (MJ unit^{-1})
Inputs		
Human labour		
Adult man	hr	1.96
Women	hr	1.57
Diesel	L	56.31
Farm machinery	kg	62.7
Fertilizers		
N	kg	60.6
P2O5	kg	11.1
K2O	kg	6.7
Farm yard manure	kg	0.3
Irrigation water	m3	1.02
Pesticide	L	120
Seed		
Rice, black gram	kg	14.7
Mustard	kg	22.7
Outputs		
Rice, black gram	kg	14.7
Mustard	kg	25.0
Rice straw	kg	12.5
Stover of mustard, black gram	kg	12.5

Source: Devasenapathy et al.[65].

Table S4. Emission factors of different agricultural inputs used in the experiment

Particulars	Unit	Kg CO_2e $unit^{-1}$
Human labour	Day	0.86
Diesel	L	3.32
Farm machinery	Hr	3.32
Chemical fertilizers		
N	kg	4.96
P_2O_5	kg	1.35
K_2O	kg	0.58
Seeds	kg	1.22
Pesticides		
Fungicide	L	3.9
Herbicide	L	6.3
Insecticide	L	5.1

Source: Lal [66] ; Wang et al. [67]